$$A + \tfrac{1}{3}A^3 + \tfrac{2}{15}A^5 + \tfrac{17}{315}A^7 + \tfrac{62}{2835}A^9 \text{ \&c.}$$

and the *Natural Secant* to the ſame Arch

$$1 + \tfrac{1}{2}A^2 + \tfrac{5}{24}A^4 + \tfrac{61}{720}A^6 + \tfrac{277}{8064}A^8 \text{ \&c.}$$

and from the Arithmetick of Infinites, the Number of theſe Secants being the Arch A, it follows, that the ſum Total of all the Infinite Secants on that Arch is

$$A + \tfrac{1}{6}A^3 + \tfrac{1}{24}A^5 + \tfrac{61}{5040}A^7 + \tfrac{277}{72576}A^9 \text{ \&c.}$$

the which, by what foregoes, is the *Logarithm Tangent*, of *Napeirs* form, for the Arch of $45^{gr} + \tfrac{1}{2}A$, as before.

And Collecting the Infinite Sum of all the *Natural Tangents* on the ſaid Arch *A*, there will ariſe

$$\tfrac{1}{2}AA + \tfrac{1}{12}A^4 + \tfrac{1}{45}A^6 + \tfrac{17}{2520}A^8 + \tfrac{31}{14175}A^{10} \text{ \&c.}$$

twhich will be found to be the Logarithm of the Secant of he ſame Arch *A*.

Accounts of Books.

I. *Catoptricæ & Dioptricæ Elementa, Auctore Davide Gregorio,* D. M. *Aſtronomiæ Profeſſore Saviliano Oxoniæ, & Soc. Reg. Socio,* 8°. *è Theatro Oxon.* 1695.

IN this Treatiſe the Learned Author demonſtrates the Principal Laws of Reflection and Refraction, without reſtraining himſelf to any Sect of Philoſophers; as alſo the properties of plain and ſpherical Surfaces in reflecting and refracting of Rays, and by the way ſhews how it comes that ſpherical Surfaces produce the ſame effects with thoſe of certain Spheroids and Conoids, *viz.* becauſe they have the ſame degree of Curvature. In the Catoptricks he determines the place of the Image, when the Object and the Eye are not in the ſame axis of the reflecting Sphere: an inconvenience that Dioptrical Machines are not ſubject to.

Then he proceeds to determine the ſituation and bigneſs of the Images of ſenſibly big Objects, with the quantity of the Angles under which they appear, from the *Speculum* or *Lens:* and ſhews where to place an Object in reſpect of any ſpherical *Speculum* or *Lens*, ſo that its Image may be of any aſſigned bigneſs.

Afterwards he ſhews how to make a Microſcope or Teleſcope of any two (or more) given *ſpecula* or *lentes*, or of a *ſpeculum* and *lens*, which ſhall magnifie in any given *ratio*, and be fitted to any given Eye: Where alſo all the poſſible Combinations of *ſpecula* and *lentes* are univerſally conſidered, and the way of reckoning the Power of Catoptrical or Dioptrical or Cata-dioptrical Machines is explained; with the way how to make a ſingle *Lens*, which ſhall produce the forementioned effects.

Laſtly, He ſhews how to make a concave *ſpeculum* of Glaſs, ſuch that the Images of a remote Object made by its two Surfaces; may be in the ſame plain, which therefore *cæteris paribus*, muſt burn more violently than any other, The whole being written with an accuracy and judgment worthy of its Author, does well merit the eſteem of the Curious and knowing in Optical Matters.

II. *Diſſertationes Medico-Phyſicæ de antris Lethiferis; de Montis Veſuvii incendio; de ſtupendo Oſſium coalitu; de immani Hypogaſtrii ſarcomate, à Bernardo Connor*, M. D *Poloniarum Regis Medico, Regiæ Societatis Londinenſis & Cameræ Regiæ Pariſienſis Socio. Ox. è Theatro Sheldoniano.* 1695. *in* 8°.

THE Author of theſe Diſcourſes begins with giving an account of Damps, obſerves a great analogy between the greater World or the Earth, and the

the leſſer, or Mans Body, which is very like the other, 'bating Life and Reaſon; having Bones, Cartilages, Membranes, Fleſh, and ſeveral circulating Fluids which have ſeveral ſecretions in many parts of the Body, and which have Vapours going out from the Body, which if checked by the Pores, return and ferment into many Diſeaſes; even ſo the greater World has Minerals, Metals, Stones, Waters, &c. and hath Analogous Motions, and its Vapours pent up, and having no vent may ferment, and may give riſe to hot Baths, and other mineral Waters: the Vapours coming out may give occaſion to Meteors, and render the Air healthful or pernicious, according to their ſeveral Natures.

Theſe Vapours he judges ſometimes to be the occaſion of *Damps*, but contrary to the common opinion, which will allow of no Damps, but from actual Steams or Vapours: he thinks Death may enſue by the want of good elaſtick Air in the place to be breathed in, as well as by the too great plenty of hurtful Vapours.

He thinks the Atmoſphære is made up of *Æther*, giving motion to its parts; Air properly ſo called, which has elaſticity; and the Vapours from the Earth, which muſt be differing according to the ſeveral bodies from whence they ariſe. He is of opinion, that Metals, Stones and Earths have their ſmaller parts too cloſely bound together, unapt to motion, too weighty and inſipid to afford thoſe poyionous particles, which he attributes rather to Salts; as we ſee Antimony and Mercury become chiefly hurtful by the acid or ſharp points of the Salts diſſolving them. He divides them into ſuch as may diſturb the Blood by coagulation of it, or by diſſolution: He inſtances the coagulating power of Steams by a new inſtance of Matter of Fact at *Paris*, of ſeveral perſons digging for hidden Treaſures, in a Cellar, found all dead in their ſeveral poſtures of work. This he illuſtrates by the operation of Thunder on ſeveral

Bodies, and Froſt in Cold Countries freezing Men in *Moſcovy*, and even in *Flanders*, ſo that they come as if alive on Horſeback, without appearing dead to the Spectators. He thinks *Plagues* may likewiſe have their riſe from one or other of theſe Steams, and according to their condenſing or rarifying effects, are to be treated by cordial or heating, and cooling or coagulating remedies.

As he thinks ſome Damps to be hurtful from the venemous Vapours, ſo he concludes others to kill by the Airs being too full of vaporous Matter, which in it ſelf may be harmleſs, but may hinder the mixing of ſufficient Air with the Blood, whereby the rarefaction and fermentation of the Blood may be hindred; this he thinks to proceed rather from Steams mixed with the Air in Caverns, than for want of motion in ſuch places; the want of which he thinks cannot make any alteration in the Air of Caverns, it being ſtill Air, and having the motion of a *fluid*, tho' not of *tranſlation*. He thinks ſtagnant Water to corrupt by the mixture of heterogeneous Bodies from the Earth and Air, rather than the want of Motion of Tranſlation; he is of opinion, that ſome Caverns are free from ſuch Damps by a Wind coming naturally out of them, which he obſerved ſo great in the large Salt Mines in *Poland*, as to raiſe Tempeſts in them under ground.

He is of opinion that ſome deadly Damps proceed alſo from the too great abundance of Æther attenuating too much the Air, which he believes to be neither hurtful from pernicious ſteams, they not affecting Candles as thoſe do; nor ſhew too great quantity of vaporous Matter; here he gives a long account of the *Neopolitan Grotto del Cane*, and the Experiments made there by him who has care of it, *viz.* that by holding a Dog by the Legs, and keeping his Head to the bottom of the Cavern, in a little while he grows convulſive, and

and dies, unleſs he be thrown into a neighbouring Pond of Water which is thought to be the Antidote. The Doctor tried a Dog and Pigeons in the ſame Cavern, and found, if their Heads were kept for ſome time below a Line of a greeniſh Colour ten inches high from the bottom of the *Grotto*, that they died; but if above that greeniſh Line, they lived: or if after being held there, they were not put into the Water, but only breathed in the freſh Air,they recovered. The Creatures ſo dying, people here eat without miſchief. The Air tried with Scales, made no alteration in the Ballance.

People at *Naples* report the killing of a Captive Turk there, others Buffaloes, Aſſes, Mules, Sheep and other Creatures, ſo that no body can doubt of its being deadly. But they differ as to the reaſon of it, ſome aſcribe it to miracles,from the Martyrs Blood ſhed there; others to an *Acid Vapour*, others to an *Alkalin*; contrary to that, the Author thinks Mercury and Antimony rather friendly than hurtful to Nature, being given every day with ſucceſs by Phyſitians, and obſerves no ulcerous diſpoſition in the Bodies of Animals killed there: neither ſees he in the ſame the Blood more coagulated than in one killed out of the Cavern. The Keeper eats thoſe thus killed like others, ſo that 'tis likely there is no poyſon in them; the Author runs thro' the Nature of all ſorts of poyſons, and concludes it not to come from any of them, but from *Æther* coming from the ſides of the Cavern, not riſing higher, but taking away its Elaſtick Power; he tells us, that tho' a Candle will not burn below the green Line, yet Gunpowder laid in a Train to the fartheſt part of the Cavern, and fired at the Mouth, will flame to the end: The Author thinks that Objection of its being deadly for want of Nitrous Particles, of no force; for that Nitre has little volatile in it, and that its Spirit and Self mixt with the Blood, coagulates, rather than makes it fluid; and that the thou-

thouſandth part of Air is not Nitrous, on which he will not enlarge, reſerving that to another Diſcourſe: But thinks it probable that the whole Air may get into the Blood and rarifie it, as we ſee it capable of rarefaction abroad, he having, after waſhing the Lungs by injections, paſſed the Air out of the *Trachæa Arteria* into the Heart by the *Vena Pulmonalis*; neither does he believe Nitre neceſſary to flame, ſeeing a Fire burns in an Oven to the farther end, whether 'tis hard to conceive it could arrive unſpoil'd of its Nitrous Particles. The Author gives another reaſon for the lingring Aſthmas, Conſumptions and Palſies of Stonecutters, Miners, &c. *viz.* the filling their Lungs with Duſt, found on their diſſection; or the coagulating the Blood by degrees, and creating Obſtructions in Lungs and Brain, whence paucity of Spirits, &c which the Author thinks may be beſt remedied with volatiles and openers of Obſtructions. He does not proceed further on *Damps*, having thought it ſufficient to give this account of them in general.

The ſame Author gives an account of *Mount Veſuvius*, and of its late Eruption; telling us that the Hill is blunt, and has at top a large cavity two miles about, which in the middle has another Mountain, and in it a Cavity. out of this comes the Smoak and Flame, which in *April* 1694. it began to throw out with a noiſe more than uſual, and affrighted the people near it; for as they removed themſelves and goods. On the fifth day after, a River of Melted Metal ran down the Mountain by a ſlow pace: to prevent the ravage of which, the Viceroy ordered a great Ditch to be dug to receive it in, where after eight days ſpace it reſted, a mile from the Sea. Then the whole River of *Metallin Matter* was from 20 to 150 paces broad, and the depth was from 15 to 80 paces; and its length 4 miles; the recrementitious and lighter parts of which were at top, the more metallin at bottom. The Author believes this matter to have

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in it *Iron, Nitre, Sulphur* and *Antimony*, for that ſome of it after frequent purifyings, if made into a Cup, will prove emetick.

The account of the very extraordinary Sceleton here treated of, is already printed in theſe Tranſactions, Numb. 215.

The laſt part of this Book, is an account of a very large *Sarcoma* or *excreſcence of the Uterus*, which came to a Woman on being frighted and kick'd on the Belly. It was 25 years growing in the Cavity of the *Uterus*, and came at laſt to be 22 inches long, 12 broad, and ten deep, weighing 42 *l.* and a quarter, being fleſhy and uniform. The Doctor gives the Figure of it, and concludes it to be no Mole, but the inward glandulous coat of the Womb grown to that bigneſs, after the manner of the *Bronchocele* in the *Alps*, or the *Polipus* in the Noſe; and has a great many reaſonable conjectures about the probable Cauſes of it and other *Tumors*, which will be beſt ſeen in the Book it ſelf, to which the Reader is referred for his further ſatisfaction.

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